BRITISH COLUMBIA
MINISTRY OF FORESTS

100 Mile House Timber Supply Area

Rationale for Allowable Annual Cut (AAC) Determination

Effective January 1, 2002

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Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the 100 Mile House Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Description of the TSA

The 100 Mile House TSA covers approximately 1 230 000 hectares in south central British Columbia. The TSA lies in the British Columbia Forest Service (BCFS) Cariboo Forest Region and is administered by the Forest Service district office in 100 Mile House. The 100 Mile House TSA is bounded by the Kamloops TSA to the south, the Cariboo Mountains and Wells Grey Park to the east, the Williams Lake TSA to the north and north west, and the Fraser River and Lillooet TSA to the west and south west.

The 100 Mile House TSA contains varied topography. The flat, dry Interior plateau separates two mountain ranges—the Marble Range to the southwest and the Quesnel Highlands to the northeast. The western portion of the TSA, along the Fraser River, has a hot, dry climate. The forests of the TSA are fairly diverse, reflecting a variety of topography and climate. The dominant tree species is lodgepole pine, but forests are also comprised of Douglas-fir, spruce, subalpine fir, western larch, western redcedar, western hemlock and deciduous trees.

Of the entire TSA, approximately 155 139 hectares are not managed directly by the BCFS, including parks, ecological reserves, private land and various special-use permit areas. An additional 131 864 hectares are considered non-productive or non-forested, including rock, swamp, alpine areas and water bodies. The amount of productive forest managed by the BCFS is about 885 000 hectares or 72 percent of the total TSA area. The long-term timber harvesting land base is reported to be 710 329 hectares.

The 100 Mile House TSA encompasses the communities of 100 Mile House (including the 108 Mile Ranch) and Clinton, with the remainder of the population dispersed in smaller rural communities including Lac la Hache, Forest Grove, 70 Mile, Lone Bute and Bridge Lake. In 1996, the population of the TSA was reported to be about 15,890, of which approximately 13 percent reside in the town of 100 Mile House.

History of the AAC

The 100 Mile House TSA was established in 1981 with an AAC of 1 250 000 cubic metres. In 1995, the chief forester set the current AAC at 1 362 000 cubic metres, effective January 1996. This level includes a partition of 112 000 cubic metres per year for problem forest types attributable to Pulpwood Agreement (PA) 16.

The current AAC of 1 362 000 cubic metres is apportioned by the Minister of Forests as follows:

Apportionment	cubic metres/year	percent
Forest licences – (3)	1 009 584	74.13
Small Business Forest Enterprise Program	207 166	15.21
Pulpwood agreements	112 000	8.22
Woodlot licences	28 250	2.07
Forest Service Reserve	5 000	0.37
Total	**1 362 000**	**100.0**

New AAC determination

Effective January 1, 2002, the new AAC for the 100 Mile House TSA is 1 334 000 cubic metres. This determination excludes 28 000 cubic metres per year for issued woodlots, but is otherwise unchanged from the previous AAC.

This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination.

Information sources used in the AAC determination

Information considered in determining the AAC for the 100 Mile House TSA include the following:

- *Cariboo-Chilcotin Land Use Plan*, October 1994;
- *Cariboo-Chilcotin Land Use Plan: 90-Day Implementation Plan, Final Report,* February 1995;
- Biodiversity Conservation Strategy for the CCLUP, July 1996 and updates;
- *Cariboo-Chilcotin Land Use Plan Integration Report,* April 6 1998;
- *Clinton Creek Watershed Management Plan,* 1989;
- Regional Mule Deer Winter Range Management Strategy for the CCLUP and update, 1996;
- 1996 Caribou Strategy and update, September 1998;
- Mountain Caribou Strategy update, October 2000;
- Cariboo Region Landscape Unit Planning Strategy, 1999;
- *Establishment to Free Growing Guidebook,* April 1995;

- *Forest Practices Code of British Columbia Act* and Regulations;
- Forest inventory planning file, BCFS 1993-1997;
- Annual statutory decision makers (SDM) letters, 1998, 1999, 2000 and SDM guide to licensees for submitting forest development plans;
- Integrated Silviculture Information System (ISIS) and Major Licence Silviculture Information System (MLSIS) records, BCFS;
- *100 Mile House Timber Supply Area: Rationale for AAC Determination,* BCFS, November 1995;
- *100 Mile House TSA Analysis Report,* BCFS, July 2001;
- *100 Mile House TSA Public Discussion Paper* BCFS, July 2001;
- *100 Mile House TSA Summary of Public Input,* BCFS, December 2001;
- Letter from the Minister of Forests, dated July 28, 1994, stating the Crown's economic and social objectives;
- Memorandum from the Minister of Forests, dated February 26, 1996, stating the Crown's economic and social objectives for province regarding visual resources;
- Technical review and evaluation of current operating conditions through comprehensive discussions with BCFS staff, notably at the AAC determination meeting, 100 Mile House, Oct. 22 and 23, 2001.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological and social conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC determinations. The information does, however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for the 100 Mile House TSA, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for timber supply areas and tree farm licence areas. Section 8 is reproduced in full as Appendix 1.

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. In making a large number of determinations for many forest management units over extended periods of time, administrative fairness requires consistency when addressing these changes and associated uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. If in some specific circumstance it is necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

(i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and

(ii) redetermining AACs frequently, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code of British Columbia Act* and its associated regulations (the Forest Practices Code).

The *Forest Practices Code of British Columbia Regulations* were originally approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although the Forest Practices Code has been fully implemented since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

The eventual timber supply impacts associated with strategic land-use decisions resulting from the various planning processes—including the Commission on Resources and Environment (CORE) process for regional plans, the Protected Areas Strategy, and Land and Resource Management Planning (LRMP) process—are often discussed in relation to current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be my position that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions not yet taken by government. Thus I do not account for possible impacts of existing or anticipated recommendations made by such planning processes, nor do I attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impacts in a current AAC determination. In many cases, government's land-use decision must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

However, where specific protected areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base and are no longer considered to contribute to the timber supply in AAC determinations.

The 100 Mile House TSA lies within the area covered by the *Cariboo Chilcotin Land-Use Plan* (CCLUP). Forest development in the TSA is required to be consistent with aspects of the plan that incorporate Higher Level Plan (HLP) direction as provided under the Forest Practices Code. The Cariboo Mid-Coast Interagency Management Committee (CMC-IAMC) and the Cariboo Chilcotin Regional Resource Board (CC-RRB) are mandated by government to monitor the implementation of the CCLUP. The CMC-IAMC and CC-RRB provide advice to the FPC statutory decision-makers regarding the best information available with respect to consistency with the CCLUP. The statutory decision-makers periodically inform licensees on how they will consider this advice or information in operational plan decisions. The timber supply analysis and my considerations in this AAC determination assume consistency with the direction from the statutory decision-makers to licensees as representative of current management.

Forest Renewal British Columbia (FRBC) has funded a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long-term. As with all components of my determinations, I require sound evidence before accounting for

the effects of intensive silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to re-determine many outdated AACs between 1992 and 1996. In any case, the data and models available today are improved from those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interest of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent court decisions including those in the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting those obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the 100 Mile House TSA. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

With respect to future treaty decisions, as with other land-use decisions it would be inappropriate for me to attempt to speculate on the impacts on timber supply that will result from decisions that have not yet been taken by government.

Overall, in making AAC determinations, I am mindful of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act* and of my responsibilities under the *Forest Practices Code of British Columbia Act* and the *Forest Act*.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review program for TSAs and TFLs.

For each AAC determination for a TSA, a timber supply analysis is carried out using an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model (Forest Service Simulator, or FSSIM), a series of timber supply forecasts

are produced, reflecting different decline rates, starting harvest levels, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TSA is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case forecast are realistic and current, and the degree to which its predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current available information about forest management, which may well have changed since the original information package was assembled. Forest management data is particularly subject to change during periods of legislative or regulatory change, such as the enactment of the Code, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case forecast. Judgements that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

Timber supply analysis for the 100 Mile House TSA

The base case harvest forecast presented in the *July 2001 100 Mile House Timber Supply Area Analysis Report* incorporated the best available information on current forest management, land base and timber yields for the TSA. It included specific assumptions related to the implementation of the Forest Practices Code, interim landscape units and draft biodiversity emphasis options, scenic corridors, and other management direction arising from the CCLUP.

These assumptions are discussed in the aforementioned timber supply analysis report. In this rationale, I will discuss many of those assumptions in the context of my considerations for this AAC determination. However, where my review of an assumption has concluded

that I am satisfied it was appropriately modelled in the timber supply analysis, I will not discuss my considerations in detail in this document.

In the timber supply analysis, the initial harvest level assumed for the base case forecast was 1 335 600 cubic metres per year. This harvest level represents the current AAC less 26 400 cubic metres attributable to woodlot licences issued at the time of the analysis. With the factors described above and others appropriate to the TSA incorporated, a 'base case' was generated and submitted for public review. This base case harvest forecast projected that a harvest level of 1 335 600 cubic metres per year could be maintained for ten decades followed by a one time reduction of approximately four percent to achieve a long-term harvest level of 1 281 600 cubic metres per year.

There were specific considerations consistent with current timber supply review policies that led to the choice of the 2001 base case forecast. These considerations included striving to achieve an initial harvest level at the current AAC, as well as providing for an orderly transition from harvesting existing natural stands to future managed stands. An alternative harvest forecast that was considered is discussed later in this document.

I have considered the reasoning used to select the base case forecast and I am satisfied that it provides a suitable basis from which to evaluate the assumptions regarding land base, management practices and timber yields for the 100 Mile House TSA. I have also considered all public input received on the data package and analysis report, and where appropriate I have discussed my considerations under the various factors presented in this rationale.

Consideration of factors as required by Section 8 of the Forest Act

Section 8 (8)

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

Land base contributing to timber harvesting

- general comments

As part of the process used to define the timber harvesting land base in the timber supply analysis, a series of deductions are made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest, for ecological, economic or social reasons. In the 100 Mile House TSA, the deductions (summarized in table 3 of the *July 2001 100 Mile House Timber Supply Area Analysis Report*) result in a timber harvesting land base of 731 027 hectares, or approximately 82.6 percent of the Crown productive forest land. Nearly 43 600 hectares have been removed for new parks.

I have considered all of the deductions applied in the derivation of the timber harvesting land base for the 100 Mile House TSA.

Those factors associated with deriving the timber harvesting land base for which, based on my thorough review, I accept the assumptions applied in the analysis are not discussed below. Where my consideration of the information has identified a factor which in my estimation requires discussion in this document, it is described below.

- inoperable sites

Those portions of the TSA, which are neither physically accessible nor economically feasible to harvest, are categorized as inoperable, and are excluded when deriving the timber harvesting land base. In the previous AAC rationale for the 100 Mile House TSA, there was an instruction to examine operability in the steeper terrain in the northeastern and eastern portions of the TSA. Since then, district staff have completed an assessment of operability and submit that it provides a good approximation of current operable areas.

In the base case forecast, an assessment based on operability mapping was used to exclude 9141 hectares of inoperable area, which is approximately one percent of the Crown-owned productive forest.

The 100 Mile House TSR Licensees Working Group (licensees working group) provided a public submission regarding assumptions in the data package. In reviewing the assumptions for operability, they contend that some of the areas targeted for exclusion are operable and should contribute to timber supply. They cite examples of past harvesting in stands that would be excluded if the operability criteria for steep slopes as described in the data package were to be applied in the analysis. District staff reviewed this submission and after reviewing the evidence they agreed. Therefore for the timber supply analysis, areas classed as cable-yarding or helicopter accessible (class 2 and 4) were reduced by 50 percent, rather than by 100 percent as recorded in the data package.

A sensitivity analysis examined the impact to timber supply of including all the class 2 and 4 areas. Including these areas increased the timber harvesting land base by 7612 hectares, and increased the base case forecast by 10 000 cubic metres per year throughout the planning horizon.

I have reviewed the information regarding the exclusions applied in the analysis to account for inoperable stands, including stands on steep slopes. I am mindful of the difficulties associated with precisely estimating operability on such a large and varied land base. I acknowledge the licensees working group's submission that some operations have occurred on steeper slopes. Typically, some level of harvesting does occur in stands outside the operable land base, which may be balanced by the avoidance of harvesting in some stands considered operable.

I note that the district staff and licensees have reviewed the criteria for inoperable areas and that reasonable revisions have been applied. Also, if all the class 2 and 4 areas prove to be inoperable in the future, then this does not pose a significant risk to the current timber supply forecasts. In consideration of the information, I am satisfied that the base case assumptions reasonably account for inoperable areas in the TSA, and I make no adjustments for this determination. I recommend that operability be reviewed and refined to reflect any necessary adjustments for the next determination.

- roads, trails and landings

In the analysis, reductions were applied to account for the permanent loss of productive forest area to roads, trails and landings. Separate reductions were applied for existing and future structures, to reflect potential changes in road building practices and future road networks required over time. The reductions were based on the estimated area that will be permanently impacted, and therefore the estimated area was excluded from contributing to the timber harvesting land base.

To account for existing roads in the analysis, the width and length of existing main roads were measured, and resulted in a deduction of 19 018 hectares. To account for existing secondary (on-block) roads, trails and landings, information was used from a study conducted in the adjacent Williams Lake TSA and adjusted to reflect the 100 Mile House TSA. The estimate from this information resulted in a deduction of 5718 hectares. Based on the assumptions for existing roads, trails and landings, deductions were applied to account for future roads, trails and landings. This resulted in reducing the timber harvesting land base (covered by forests older than 60 years) by 3.8 percent.

The licensee working group submission questions the deductions applied to account for roads, trails and landings. Based on their review of regeneration ingress on existing roads, they submit that the deductions are closer to 2.5 to 3.0 percent.

I have considered the assumptions applied in the analysis for both existing and future roads, trails and landings and have discussed this information with district staff. I note that the licensees have expressed concern about the assumptions, in particular the potential for regeneration ingress along road edges. I understand that an in-depth study has been proposed to further examine this matter. Prior to the next determination, I encourage the licensees to work with district staff to assess appropriate reductions that reflect current operational conditions and future projections for the 100 Mile House TSA. I am mindful that the degree of uncertainty expressed by the licensees does not pose a risk to timber supply at this time. For this determination, I make no adjustments regarding estimates for roads, trails and landings.

- woodlots

The *Forest Act* requires that AACs determined for TSAs exclude woodlot licences. Therefore in the timber supply analysis, 17 938 hectares of woodlot licences were excluded from the timber harvesting land base. To account for the AAC associated with this area, the initial harvest level in the base case forecast was set at 1 335 600 cubic metres per year (26 400 cubic metres below the current AAC). Since completing the timber supply analysis, new woodlot licences have been issued and some existing woodlots have been enlarged. These changes result in an additional timber supply reduction of 1600 cubic metres per year, and a timber harvesting land base reduction of 1000 hectares.

I have reviewed the information regarding woodlot licences in the 100 Mile House TSA. I have excluded an annual harvest level of 28 000 cubic metres for issued woodlot licences as discussed below, under 'Reasons for decision'.

- pulpwood agreement areas

In recognition of the extent of problem forest types in 100 Mile House TSA, two pulpwood agreements—PA 16 and PA 2—have been issued and cover the entire TSA. There are no plans in place to begin harvesting under PA 2, however, harvesting under PA 16 has been active over the past few years. The Kamloops and Cariboo Forest Regions administer PA 16—a non-replaceable 25 year licence issued to Ainsworth Lumber Co.—which provides the rights to harvest up to 112 000 cubic metres of problem forest types within the 100 Mile House TSA.

In the timber supply analysis, forest types that contribute to PA 16 cover about 93 000 hectares or 13 percent of the timber harvesting land base. The base case forecast showed that a harvest level of 112 000 cubic metres per year could be maintained for approximately 20 years (15 years remaining for the agreement). After this period, the harvest level declined to zero until the fourth decade where it gradually starts to increase, and by the sixth decade it achieves about 100 000 cubic metres for the remaining planning horizon.

During the past 6 years, the average harvest has been about 23 000 cubic metres per year, however this level is expected to increase in the future. I understand that a BCFS and licensee working group has been reviewing the licence agreement to clarify management issues regarding the terms of the licence agreement. In a submission from Ainsworth, they asked that the harvest level for 100 Mile House TSA be increased to 135 000 cubic metres per year for the remainder of the agreement.

I note that Ainsworth and district staff have experienced some difficulty identifying the timber types on the ground as currently described in the license agreement. Also, BCFS staff have expressed some concern about the targeting of deciduous stands, some of which have high biological and conservation values in this TSA. I acknowledge the concern about harvesting deciduous trees, and I expect that the working group will examine this issue to reduce concerns about impacting biodiversity, given requirements in the Forest Practices Code. For this determination, staff advised me that the base case forecast, including the PA 16 partition is reflective of stand- and landscape-level biodiversity constraints within the current policy framework.

Having reviewed the information about PA 16 and considered the present commitment under this licence, I am satisfied that the assumptions in the base case forecast appropriately reflect the current licence agreement in the 100 Mile House TSA. I acknowledge that the working group is developing an agreement between the Kamloops and Cariboo Forest Regions regarding the harvest level split between these two regions. However, the licence agreement has not yet been formally amended to provide revised harvest levels by TSA, or changes to definitions or administration of how to identify stands that are eligible for harvest under the agreement. I expect that this ongoing work will ultimately address the district's concern about identifying PA16 timber types on the ground. I am satisfied that the deciduous stands accounted for in the base case forecast are reflective of biodiversity constraints within the current policy framework. In summary, I accept that the best available information was used in the timber supply analysis, and make no adjustments to account for this factor. For the next determination, I request that staff monitor harvesting

of stands covered by the PA16 agreement to ensure that any necessary adjustments are applied in the next determination.

Existing forest inventory

- current inventory

The inventory data used for the timber supply analysis is based on a forest inventory conducted between 1972 and 1976. For the analysis, the inventory file was updated to between 1993 and 1997 to account for changes in ownership, forest growth, and denudation through harvesting or fire.

In total, almost 75 percent of the stands in the timber harvesting land base are at, or above the minimum harvestable ages. The dominant species are lodgepole pine, Douglas-fir and spruce/subalpine fir, which cover 55 percent, 31 percent and 9 percent, respectively of the timber harvesting land base.

Based on a review of an inventory audit conducted in 1999 in the 100 Mile House TSA, regional staff found discrepancies between the ages of forest stands reported in the forest inventory compared to those measured from the field samples. Staff expressed concern that overestimating the actual ages of forest stands may affect timber supply assumptions about seral age objectives for landscape-level biodiversity. I have discussed the audit findings further, under *volume estimates for existing stands* and *landscape-level biodiversity*.

I have reviewed these discrepancies and am aware of the limitations of the data. I suggest that prior to the next determination, the inventory be reviewed and that necessary adjustments be applied to the forest stand attributes. For this determination, I have considered the forest inventory to be the best available information.

- volume estimates for existing stands

Volumes for existing natural stands were estimated using forest inventory attributes and the Variable Density Yield Prediction (VDYP) model, which was developed by the BCFS Resources Inventory Branch.

The inventory audit conducted in 1999 found that the audit volumes based on ground measurements was about 11 percent lower than those based on forest inventory attributes (for existing stand greater than 60 years old). However, the difference was not statistically significant at the 95 percent confidence level.

In an attempt to identify possible sources of the discrepancies between the audit results and the inventory, regional and district staff conducted a further examination of the audit data. Their examination suggests that most of the differences could be localized to stands in the Interior Douglas-fir (IDF) biogeoclimatic zone.

BCFS staff conducted sensitivity analyses to examine the impact to timber supply if volumes have been overestimated by either 10 percent for all existing stands, or 25 percent for stands in the IDF zone. If all existing stands have been overestimated by 10 percent, the initial base case level could only be maintained for two decades, not 10 decades as shown in the base case forecast, however the long-term harvest level was the same. If stands in the

IDF zone have been overestimated by 25 percent, then the initial harvest level could only be maintained for one decade before declining to levels about 16 percent below the base case mid-term levels. Further I note that because of the date of the last inventory update, this determination is already about four years into the first decade as projected in the base case forecast.

I have considered the inventory audit findings regarding volume estimates for existing stands in the 100 Mile House TSA. Although the audit did not indicate statistically significant volume differences, staff and I are concerned that volumes may be overestimated in this TSA. I acknowledge that it is difficult to assess the specific implications to timber supply as a result of the audit without further sampling information. Nonetheless, I am mindful of the potential risk posed to timber supply if indeed existing stand volumes are overestimated by the inventory file attributes. I will request the assistance of staff from the Ministry of Sustainable Resource Management to undertake a vegetation resource inventory (VRI) for the 100 Mile House TSA to improve our confidence in the existing stand volumes.

Although the verification or exact magnitude of an overestimation is uncertain, the audit findings indicate that it could be up to 11 percent, and in turn could affect other factors, such as landscape-level biodiversity and seral stage distributions. I have considered the risk to timber supply if existing stand volumes have been overestimated as discussed below under 'Reasons for decision.'

Expected rate of growth

- volume estimates for regenerating stands

I have considered the information regarding the volume estimates for regenerating stands, including the various operational adjustment factors (OAFs) applied to volume estimates. I am satisfied that the analysis used the best information available for volume estimates for regenerating stands, and I will not discuss my considerations in detail in this rationale. However, I note that the OAF1 applied in the analysis is 10 percent rather than the standard 15 percent. The reduced OAF was determined to be more appropriate based on a review of silviculture records, which indicated that regeneration efforts are attaining full site occupancy. While this OAF adjustment was based on local data, I urge district staff to continue to review the OAFs for the next timber supply analysis.

- site productivity estimates

Inventory data includes estimates of site productivity for each forest stand. Site productivity is expressed in terms of a site index, which is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow, which in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the age at which a stand will reach a merchantable size.

In general, in British Columbia, site indices determined from younger stands (i.e., less than 31 years old), and older stands (i.e., over 140 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in several areas of the province where studies—such as the Old-Growth Site Index (OGSI) 'paired plot' project and the 'veteran' study, as well as results from using the Site Index Biogeoclimatic Ecosystem Classification System (SIBEC)—suggest that actual site indices may be higher than those indicated by existing data from old-growth forests. Such studies indicate that site productivity has generally been underestimated by the inventory file data; managed stands tend to grow faster than projected by inventory-based site index estimates from old-growth stands.

Sensitivity analysis was used to assess the impact to timber supply if site productivity is underestimated to the extent suggested by the OGSI studies. For the sensitivity analysis, the site indices of all stands older than 140 years (non-PA 16 stands and even-aged managed stands), which comprise 6 percent of the timber harvesting land base, were adjusted using the provincial OGSI data. For lodgepole pine and interior spruce, adjustments were based on paired plot data; for all other species adjustments were based on veteran tree study data. In the sensitivity analysis the stand volumes, minimum harvestable ages and green-up ages were adjusted to account for the increased site productivity. The analysis results indicate that beginning in the eleventh decade, the harvest level could be about 4.2 percent higher than the base case forecast.

A submission from the 100 Mile House TSA Major Licensees' Association (major licensee's association) stated that ongoing work on calibrating yield models in the IDF biogeoclimatic zone is indicating higher average annual growth than used in the analysis. As well, they note that a consultant's report shows that the estimated site indices of the sampled stands (less than 40 years) were on average about 4.5 metres higher than the inventory site indices. However, staff note that is it not clear if there is a straight correlation between the site indices sampled and the forest inventory attributes. While I am pleased that work has been undertaken to obtain better estimates of site productivity, I recommend that BCFS Research Branch and regional staff examine the study further to determine if the findings can be applied across the TSA.

The provincial evidence and local experience indicates that the site indices used in the base case forecast could be underestimated, and I acknowledge that this could lead to improved timber supply forecasts in the future. I note that the short-term timber supply in this TSA is not sensitive when tested for an underestimation of regenerated stand volumes, green-up ages or minimum harvestable ages, therefore any potential impact will mainly affect the long-term timber supply. For this determination, I have considered that the timber supply in the mid- to long-term could be up to 4.2 percent greater than projected in the base case, and I will discuss my considerations of this further under 'Reasons for decision'.

More local data would provide improved certainty about site productivity in the 100 Mile House TSA, and I encourage the ongoing collection and analysis of data from stands within the TSA for future timber supply analyses.

- minimum harvestable criteria

A minimum harvestable age is an estimate of the earliest age at which a forest stand has met minimum merchantability criteria. In practice, many forest stands are harvested beyond the minimum harvestable age due to constraints on harvesting which arise from managing for other forest values such as visual quality, wildlife and water quality.

In preparation for the timber supply analysis, district staff reviewed data from current practice and compiled a set of criteria to determine minimum harvestable ages. The criteria used in the base case forecast were based on species, minimum stand volumes and expected harvest systems.

In the base case forecast, stands were considered merchantable at the earliest age of when they either attained a volume of 65 cubic metres per hectare, or 80 years for pine-leading stands or 120 years for all other stands. District staff confirm that this criteria is reflective of the current practices guiding harvesting in the TSA. Sensitivity analysis showed that changing the minimum volume criteria to 75 cubic metres per hectare had no impact on the timber supply forecasts. Using the culmination of mean annual increment as the minimum harvestable age had no impact in the short term, but reduced the base case forecast by 5000 cubic metres per year after the tenth decade.

While I observe that 65 cubic metres per hectare is an extraordinarily low merchantability threshold, I also note that it is always difficult to precisely estimate minimum harvestable ages, as to some extent it requires an estimation of future preferences and markets. I have considered the information regarding minimum harvestable ages, and given the noted low sensitivity (5000 cubic metres per year less timber supply in the long term) of shifting the criteria to culmination age, I am satisfied that the assumptions applied in the analysis do not introduce unacceptable risk in this determination. I request that staff undertake a thorough review of the criteria for minimum harvestable ages prior to the next determination.

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

Expected time for forests to be re-established following harvest

- regeneration delay

Regeneration delay is the time between harvesting and when an area becomes occupied by a specified minimum number of acceptable, well-spaced seedlings. In the base case forecast, regeneration delays ranged from 3 years for planted areas, to 5 years for naturally restocked areas. In the previous timber supply analysis, regeneration delays were 4 years for planted areas and 7 years for naturally restocked areas. Staff based the current estimates of actual delay periods on data collected from the integrated silviculture information system database, and I accept these as representing the best available information for this determination.

I also note that in the course of reviewing this factor, questions arose with respect to stocking density objectives and trends in the species being regenerated in the TSA. While not specifically related to regeneration delay estimates, I have nonetheless requested that the district and region should review these matters prior to the next determination so that any necessary changes could be applied in the next timber supply analysis.

- not-satisfactorily-restocked areas

Not-satisfactorily-restocked (NSR) areas are those where timber has been removed, either by harvesting or by natural causes, and a stand of suitable tree species and stocking has yet to be established. Areas where the standard regeneration delay has not yet elapsed since harvesting are considered 'current' NSR. Where a suitable stand has not been regenerated and the site was disturbed before 1987, the classification is 'backlog' NSR.

The 100 Mile House TSA silviculture records (MLSIS/ISIS) showed 7439 hectares of backlog NSR, and 28 440 hectares of current NSR. I accept the estimate of area classified as current NSR. The analysis assumed all backlog NSR will be restocked within 10 years. From my discussions with staff, I acknowledge that small amounts of backlog NSR will likely not be fully restocked within 10 years, and could either become inoperable or remain NSR, mainly due to the cost of restocking. I have considered this as representing a small-unquantified risk to the long-term timber supply as discussed below, under 'Reasons for decision.' Any necessary adjustments should be applied in the next timber supply analysis to reflect improved information regarding the amount of backlog NSR.

(iii) silviculture treatments to be applied to the area,

Silvicultural treatments to be applied

- silvicultural systems

I have reviewed the information regarding silvicultural systems, and I am satisfied that the base case assumptions for these factors were appropriate. As a result, I will not discuss my considerations in the rationale.

- incremental silviculture and the use of select seed

I am aware that Lignum Limited has an Innovative Forest Practices Agreement, which covers part of the TSA, and some initial results from an analysis conducted as part of the agreement shows that higher timber supply forecasts are possible due to incremental silviculture activities and other associated investments on the land base. While the results have not been incorporated into the timber supply analysis, I am mindful that this could potentially influence the next determination.

The Forest Practices Code requires the use of the best quality genetic material (seed and vegetative material) available for regeneration. Select seed produced from seed orchards is the product of B.C.'s forest gene resource management program, which uses traditional tree breeding techniques to select naturally-occurring, well-adapted, healthy and vigorous trees.

Select seed from seed orchards produce trees that grow faster than those selected from natural stands. As a result, a stand composed of trees from select seed has a greater volume

at the same age than a natural stand with the same species composition. Current expectations are that the volume differences will begin to decrease beyond a certain stand age. There is limited use of select 'class A' seed in the TSA but no adjustments were applied in the analysis to reflect the gains for the 100 Mile House TSA. I have considered the information regarding the limited use of select seed in the 100 Mile House TSA as discussed below, under 'Reasons for decision.'

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

- timber utilization

Utilization standards define the species, dimensions and quality of trees that must be removed from an area during harvesting operations. In the 100 Mile House TSA, all trees greater than 12.5 centimetres diameter at breast height (dbh) in pine-leading stands were assumed to contribute to volume estimates in the base case forecast. This minimum reflects the license specifications for sawlog utilizations. However, in practice, trees greater than 10 centimetres dbh are currently being utilized in nearly 30 percent of the pine-leading, sawlog quality stands. Also, this level of utlilization is operationally required in stands suitable for PA 16. I am advised that the minor diameter differences between the analysis and practices would have a negligible effect on the timber supply, and I am satisfied that the standards applied in the base case forecast are reasonable. I request that this be reviewed prior to the next determination to assess if the utilization changes can be directly reflected in the timber supply analysis.

- allowances for decay, waste and breakage

I have reviewed the information regarding allowances for decay, waste and breakage used in the base case forecast for the 100 Mile House TSA, and I am satisfied that the assumptions for this factor are appropriate.

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production,

<u>Integrated resource management objectives</u>

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are co-ordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

To manage for resources such as water quality and aesthetics, current harvesting practices limit the size and shape of cutblocks and amount of disturbance (areas covered by stands of less than a specified height), and prescribe minimum green-up heights for regenerated stands on harvested areas before adjacent areas may be harvested. Forest cover requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

In the timber supply analysis, as described in the *July 2001 100 Mile House Timber Supply Area Analysis Report*, several management zones were created and different forest cover requirements were applied to the stands in each zone. These management zones—Clinton community watershed, selection, visuals, mule deer winter range, caribou, Pulpwood Agreement 16, and multiple use—were developed to reflect different operational considerations.

I have reviewed the information presented to me regarding the analysis assumptions for cutblock adjacency, visually sensitive areas and community watersheds, and I am satisfied that the analysis has appropriately reflected operational constraints within these areas. I am also satisfied that, with the exception of areas noted in the following sections, that the assumptions regarding these factors in the analysis are consistent with the Cariboo-Chilcotin Land Use Plan. As a result, I will not discuss my considerations of these factors within this rationale document. The factors discussed below are those for which I believe my considerations require some detailed explanation.

- classified lakes and riparian habitat

Riparian areas occur along streams, around lakes and in wetlands. The *Riparian Management Area Guidebook* requires the establishment of riparian reserve zones (RRZs) that exclude timber harvesting, and riparian management zones (RMZs) that restrict timber harvesting in order to protect riparian and aquatic habitats.

In 1997, a random sample of 12 mapsheets in the 100 Mile House TSA was reviewed by both BCFS and (former) MELP staff to derive the amount of riparian area along streams. For the analysis, to account for management in RRZs and RMZs, a total of 56 930 hectares were excluded from the timber harvesting land base.

At the time of the analysis, only 8 'class A' lakes had been identified. To account for this, 593 hectares were excluded from the timber harvesting land base. Since then, an additional 20 'class A', and 445 'class B and C' lakes have been either classified or are being managed under interim measures. The buffers for these lakes cover an additional 7442 hectares, which staff note should not contribute to the timber harvesting land base.

I have considered the information regarding the exclusions applied in the analysis to account for management in riparian habitat and lake buffers. I am satisfied with the exclusions for riparian habitat along streams as representing the best available information and I have accounted for the additional 7442 hectares identified for lake buffers as discussed below, under 'Reasons for decision.' For the next determination, I encourage the appropriate ministry staff to work together to expedite the planning process for completing the mapping of lake buffers before the next analysis.

- identified wildlife

Under the *Forest Practices Code of British Columbia Act*, identified wildlife are those wildlife species that have been approved by the chief forester and deputy minister of Environment, Lands and Parks or designate as requiring special management. The province's Identified Wildlife Management Strategy (IWMS) for dealing with endangered, threatened, vulnerable, and regionally significant species which have not been accounted

for with existing management strategies—such as those for biodiversity, riparian management, ungulate winter range or through the application of other forest cover constraints—was announced on February 19, 1999.

Volume I of the IWMS lists 14 species which may occur and which require future consideration in the TSA. These species were also identified in the CCLUP.

Throughout the province, identified wildlife species are being managed through the establishment of wildlife habitat areas (WHAs) and implementation of general wildlife measures (GWMs). Based on data accumulated on the habitat requirements for the identified species, the estimated impact of IWMS was projected at one percent of the short-term harvest level for the province.

In the area covered by the CCLUP, management objectives for identified wildlife are required to be achieved without compromising the targets established in the plan for timber supply. To this end, it is expected that management for identified fish, birds and mammals will be accommodated within the area-based HLP targets available for management of non-timber values (equivalent excluded area). Where possible, areas needed to manage for identified species will be overlapped with provisions for other non-timber values, such as riparian areas, wildlife tree patches (WTPs), and old-growth management areas (OGMAs). Where this is not possible the WHA impact will be managed within the total impact allowed for non-timber values on the HLP targets.

Beyond recognizing the constraints applied in the analysis for provisions for non-timber values, such as riparian areas, ungulate habitat and biodiversity as discussed in this document, the timber supply analysis incorporated no specific constraints for the management of identified wildlife.

From the foregoing I have reasoned as follows. The species in the TSA that potentially require special consideration under the IWMS have been identified, as have some elements of the means for meeting objectives for those species. However, the ultimate extent of the forest cover provisions necessary for their management, and the degree to which these may be accomplished within anticipated components of sub-regional plans in support of the CCLUP cannot be determined until these plans are complete. My usual approach to uncertainty in this regard is to rely on the recognition by government that the implementation of the IWMS will have a maximum impact of one-percent on the provincial timber supply, and to make an equivalent allowance in my determination. However, the government-approved intention of the CCLUP is to manage for these species within the provisions of the plan, which include specified limits on impacts to the timber supply. In this case therefore, pending the development of sub-regional strategies and subsequent analysis, I have assumed that the CCLUP contains adequate provisions for meeting objectives for identified wildlife species and I make no adjustments in this determination.

- ungulates

There are several ungulate species in the 100 Mile House TSA. Habitat requirements for ungulates, specifically caribou and mule deer, were modelled in the analysis. This was accomplished by reflecting no-harvest zones for caribou habitat, and selective (modified) harvesting zones for caribou and mule deer winter range.

The CCLUP provides direction for management of the Eastern caribou herd in the 100 Mile House TSA. The no-harvest zone — covering 6812 hectares of the Crown productive forest — reflects the 1998 *Caribou Strategy Update* and was appropriately excluded in the analysis. I note that some limited salvage harvesting is permitted in this area but does not represent a significant impact on the overall timber supply in this TSA. This can be further reviewed at the time of the next timber supply analysis.

In addition, the 1998 *Caribou Strategy Update* identified 609 hectares that are specifically managed as modified caribou habitat. The intent of this management is to maintain lichen and to minimize the fragmentation of the forest stands. The management restricts the amount of disturbance allowed every 20 years in each affected landscape unit to a maximum of 33 percent of the 'modified harvest area'. This was accounted for in the analysis by requiring proportionate harvesting by landscape period every 20-years.

From my discussion of these issues with staff of the 100 Mile House District and with the (former) MELP Forest Ecosystem Specialist for the area, I am satisfied that appropriate measures have been made to apply constraints in the analysis that reasonably reflect the current practices designed to achieve management of caribou habitat in accordance with the CCLUP.

To reflect the objectives of the CCLUP's Mule Deer Strategy, selection and clearcut zones were identified on about 10 percent of the timber harvesting land base for mule deer winter range (MDWR). In the analysis, a complex series of harvesting constraints (area control) were employed on 5.5 percent of the area to regulate the selection harvesting, rather than forest cover requirements. In the selection MDWR zone — dry belt Douglas-fir, and stands with more than 40 percent Douglas-fir — constraints were applied that permitted harvesting entries only every 30 or 50 years, depending on the extent of 'crown closure' in the forest. On the remaining 4.5 percent of the zone— stands with less than 40-percent Douglas-fir— the winter ranges were assumed to be managed by an even-aged silvicultural system (clearcutting) with no additional harvest restriction beyond the provision for wildlife tree patches (WTPs).

District and region staff have reviewed these assumptions and indicate that the management strategy for selection harvesting is expanding to include stands with more than 20 percent Douglas-fir. The amount of area reported to have between 20 to 40 percent Douglas-fir is about 4.3 percent of the timber harvesting land base. Timber Supply Branch staff advise that expanding the selection MDWR zone would not impact the timber supply in the short term, and likely represents only a small unquantified downward pressure in the mid to long term.

I have reviewed the methodology employed in the analysis to account for the current strategy for MDWR management, which is expect to be consistent with the CCLUP. While

the constraints employed are essentially proxies for actual management strategies, in the absence of specific plans within the zone I consider the constraints as applied to be as careful a representation as currently possible. Nonetheless, I understand that strategies are still evolving and that as a result more area may be included in the selection MDWR zone. While this does not impact the timber supply in the short term, it could represent a small unquantified downward pressure in the mid to long term. I have considered this as discussed below, under 'Reasons for decision.'

Implementation of the mule deer strategy and the sub-regional planning process currently underway will help to improve the methodology for accounting for MDWR in the next timber supply analysis.

- stand-level biodiversity

Stand-level biodiversity is managed in part by retaining reserves of mature timber or wildlife trees (WTs) and patches (WTPs) within cutblocks and in adjacent inoperable and other retained areas to provide structural diversity and wildlife habitat.

Wildlife tree patch retention targets were developed by the Ministry of Forests and the former Ministry of Environment, Lands and Parks staff using Tables 20a and 20b of the *Biodiversity Guidebook* (equivalent to Tables A3.1. and A3.2 in the *Landscape Unit Planning Guide).* The guidebook specifies for each draft landscape unit two wildlife tree patch retention targets — one for when landscape units are in place (20a) and one for when they are not (20b). Operationally, district staff are applying targets based on Table 20b.

In order to account for the area that has been reserved for stand-level biodiversity, district staff examined 465 cutblocks harvested between January 1994 and June 1997 – an early period of implementing stand-level biodiversity. From this examination, in the base case 47 233 hectares (6.5 percent of the current timber harvesting land base) were deducted for WTPs, and volumes were reduced by 6.3 percent to account for WTs (combined impact of about 13 percent constraint on timber supply). I note that the cutblocks studied were harvested using retention requirements based on Table 20b.

In most other timber supply analyses for TSAs, stand-level retention targets are based on using Table 20a because forest cover requirements are also applied for landscape-level biodiversity in the base case. Although this is a departure from operational practices, it is expected that the timber supply analysis recognize the Forest Practices Code which sets out requirements for stand- and landscape-level biodiversity.

The *Biodiversity Conservation Strategy* for the CCLUP provides guidance for the retention of old and mature plus old forest conditions across the landscape. Draft landscape unit boundaries and objectives have been provided for use in the regional sub-regional planning process and as information for landscape unit and operational planning. In January 1999, statutory decision-makers identified a strategy to manage the old seral requirements by landscape unit and BEC zones and therefore these landscape-level objectives were applied in the base case. In consideration of this, the amount of retention for stand-level biodiversity (wildlife tree retention) should have been reduced by about 3 percent (from 13 to 10 percent). As well, the analysis for the CCLUP Integration Report assumes that one half of the area left for stand-level biodiversity is expected to be harvested in the second

rotation after replacement, hence about 5 percent retention would be required. Nonetheless, district staff are concerned that harvesting some of the wildlife trees may affect other resource values or not be economically viable.

Having reviewed the information regarding assumptions in the analysis for stand-level biodiversity, I consider the reductions applied to be high and am concerned that in practice they may overlap with other reductions applied in the analysis, such as those to account for landscape-level biodiversity or operational factors. While a more appropriate reduction might be in the order of 5 percent in place of the 13 percent, I am mindful of the uncertainty about recovering half of the wildlife trees and wildlife tree patches. In summary, I will account for the implications of underestimating timber supply by at least 3 percent (using Table 20a and no recovery) and a further 5 percent (using Table 20a and recovery of up to half of the wildlife trees) as discussed below, under 'Reasons for decision'.

Before the next timber supply analysis, I strongly urge district and regional staff to resolve the uncertainty associated with accounting for stand-level biodiversity.

- landscape-level biodiversity

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. Managing for biodiversity is based in part on the principle that this—together with other provisions in the Forest Practices Code, such as riparian management, maintenance of wildlife trees, and other forest cover objectives—will provide for the habitat needs of most forest and range organisms. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species dependent on, or strongly associated with, old-growth forests.

The *Landscape Unit Planning Guide* outlines three biodiversity emphases options (BEOs)—lower, intermediate and higher—which may be employed when establishing biodiversity management objectives for a landscape unit. The guide outlines the proportions of each sub-regional planning area that should be assigned to each of the three BEOs. The proportions in lower and intermediate biodiversity emphasis can range from 30 to 55 percent, but the average is approximately 45 percent of the area in lower, 45 percent in intermediate, and 10 percent in the higher BEO. The policy generally followed for timber supply analyses when landscape units and BEOs have not been formally established is to model the distribution of BEOs using a weighted average forest cover requirement.

As discussed above, the (Cariboo) *Biodiversity Conservation Strategy* does however provide guidance for the retention of old and mature plus old forest conditions across the landscape. Delineation and formal designation of biodiversity emphases have not yet been approved for landscape units in the 100 Mile House TSA; however in January, 1999, statutory-decision makers recognized the CCLUP Integration Report and identified a strategy to manage the old seral requirements by landscape unit and BEC zones.

Because of the time lag between the data package and the determination meeting there are some differences between current practice and the analysis, however sensitivity analyses

that looked at these differences showed no changes to the base case. The sensitivity analyses were undertaken to examine the impact of applying draft BEO's to meet old-seral targets immediately, and to implement the conservation strategy of old and mature plus old immediately.

Older stands on the timber harvesting land base were modelled as areas of temporary Old Growth Management Areas (OGMAs) until the areas outside the timber harvesting land base became older than 250 years. In terms of landscape-level biodiversity, a large proportion of the old-seral requirements (i.e. - OGMAs) were assumed to be met over time by the areas outside of the timber harvesting land base—the non-contributing forest—in the analysis because the non-contributing forest continued to age without assuming some amount of disturbance. The implications of this assumption are that no allowance is made for the possible influences that natural stand disturbances such as fire, insects or disease may have on age class structure of the non-contributing forests through time. In reality, the non-contributing forests do not actually continuously age. In the 100 Mile House TSA, natural disturbance patterns are such that infrequent, but large wildfires affect the age class structure of the forests on the non-contributing land base.

I have reviewed the information regarding the analysis assumptions about the ageing of the forests on the non-contributing land base. It is clear that the forests outside the timber harvesting land base in the 100 Mile House TSA do experience stand-level disturbances, which were not reflected in the analysis. As a result, the contribution of these forests to meeting old-seral biodiversity objectives has likely been overestimated in the analysis. A sensitivity analysis that examined the impact of assuming disturbances on the non-contributing land base showed a 5-percent reduction to the long-term harvest level.

In addition, as discussed earlier, the inventory audit reported significant differences between the age of forest stands reported in the forest inventory compared to those measured from the field samples. If ages have been overestimated this could affect seral age distribution, but it is not clear what impact this would have on timber supply. I request that this matter be fully reviewed prior to the next determination.

I am satisfied that the assumptions appropriately reflect the provincial policy direction for achieving landscape level biodiversity requirements provided in the *Landscape Unit Planning Guide*, as well as providing results that are consistent with the CCLUP. However, regarding the assumptions applied to account for natural stand-level disturbances on the non-contributing land base, I have accounted for up to a 5-percent downward pressure on the long-term harvest level as discussed below under, 'Reason for decision.'

- cultural heritage resources

Cultural heritage resources are defined in the *Forest Act* and include archaeological sites, traditional use sites and objects such as culturally modified trees (CMT's). Archaeological sites and CMT's that predate 1846 are protected under the *Heritage Conservation Act.* The nature and extent of the required protection of archaeological sites is detailed under this legislation.

An archaeological overview assessment (AOA) has been completed for most of the entire 100 Mile House TSA in 1996. Tsq'escen, Esketetemc and T'exelc Band's have each

conducted band specific traditional use surveys in 1998. As part of the AOA, general areas with a high potential for finding cultural heritage resources were identified, but specific locations have not been confirmed.

Most archaeological sites are found near water bodies, in areas of high fish and game values. In the analysis, no specific reductions were applied as these areas often coincide with and can be accounted for by riparian reserves and other deductions, with little or no additional impact on the timber supply.

In view of the probable overlaps with excluded areas to date, I consider the absence of specific exclusions for cultural heritage resources to be appropriate for this AAC determination. Any emerging information from the traditional use surveys or any other studies can be accounted for in the next AAC determination.

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

Cariboo-Chilcotin Land Use Plan and 100 Mile House Sub-Regional Planning

The CCLUP incorporates a number of components, including management strategies for eastern caribou, mule deer winter range, a biodiversity strategy, and sub-regional planning processes in the TSA. Landscape unit planning is expected to be completed in 2003, at which time the currently draft landscape unit boundaries and objectives are expected to become legally established. For ongoing implementation of the CCLUP in the interim period before formal establishment of the boundaries and objectives, the statutory decision-makers issue direction to licensees periodically by letter, explaining how draft objectives and rules are to be interpreted for, and incorporated in, forest planning at the operational level. In formulating this direction they are advised by staff of the Land Use Co-ordination Office, the BCFS regional office, and from the former MELP and consider information provided by the IAMC.

The BC Forest Practices Board expressed concern in December 2000 over perceived inconsistencies between the HLP aspects of the CCLUP and its ongoing implementation. I am advised that, with minor exceptions, these concerns are generally not shared by the agencies mandated by government to monitor the implementation of the CCLUP—the Cariboo Mid-Coast Inter-Agency Management Committee and the Cariboo-Chilcotin Regional Resources Board (which includes representation from municipal governments, environmental organizations and other stakeholders)—or by the local forest products industry. I am also advised that clarification on some of the issues raised has been sought from government, and that other clarification may be provided as a matter of course at later stages in the formal planning process, including when sub-regional planning and landscape-unit planning are complete. In the meantime, I place weight on government's initial formal response to the Forest Practices Board and expect that subsequent responses will continue to provide further clarity.

I am satisfied that the CCLUP has been modelled in the timber supply analysis consistent with the land-use ministries expectations and direction and I am confident that the recommendations of the CCLUP and the impending sub-regional plan will continue to guide current practice. I acknowledge the concerns expressed by the public and the

uncertainty created by the evolving planning process. District and regional staff will continue to monitor the direction of the CCLUP and any appropriate changes can be incorporated into the next timber supply analysis.

- *First Nations*

Both the Cariboo Tribal Council (comprised of the Canim Lake, Canoe Creek, Soda Creek and Williams Lake bands) and the Esketemc First Nation are in stage 4 of the BC Treaty process. The Cariboo Tribal Council has signed a two-year memorandum-of-understanding with the BC Forest Service to share information, and the Esketemc First Nation is also negotiating a similar agreement.

As I have stated earlier, I am aware of the Crown's lègal obligations resulting from recent court decisions including those in the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting those obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the 100 Mile House TSA. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

With respect to future treaty decisions, as with other land-use decisions it would be inappropriate for me to attempt to speculate on the impacts on timber supply that will result from decisions that have not yet been taken by government. Therefore I will accept that this is the best available information and is adequate for use in this determination.

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

Alternative rates of harvest

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large volumes of older forests often permits harvesting above long-term levels without jeopardising future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and medium-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

The base case forecast represents only one of several harvest forecasts that could be achieved for the 100 Mile House TSA given the current management regime and objectives. The assumptions for these alternative forecasts are discussed in detail in the *July 2001 100 Mile House Timber Supply Area Analysis Report.*

As shown in the previous 1996 AAC determination, a notable feature of the base case forecast was its relative stability over time. Similarly, the current base case forecast

indicates that the AAC of 1 362 000 cubic metres less woodlots could be maintained for 10 decades, then the steady long-term harvest level is achieved after a one-time reduction of 4 percent. An alternative forecast examined a 10 percent increase in the short-term, which could be maintained for 4 decades, without compromising the long-term timber supply.

Although the alternative forecast indicates that a higher harvest level is possible, I must take a balanced approach in considering any potential increase in short-term harvest levels by making allowances for risks that might arise because of identified uncertainties. In making my determination, I have taken into account the harvest flow implications of a range of uncertainties related to specific considerations laid out in this document.

Community implications

I have reviewed the information presented about the implications to communities of fluctuations in the harvest level in the 100 Mile House TSA, including the information in the socio-economic analysis completed as part of the timber supply analysis for the TSA. I am aware of the implications to communities of changes in the harvest levels for the TSA.

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

Timber processing facilities

District staff indicates that local mills have a processing capacity of about 1.7 million cubic metres per year, substantially above the current AAC. Approximately 75 percent of the timber harvested in the TSA is processed locally. I have reviewed the information regarding timber processing facilities, and I am mindful of the reliance of timber processing facilities on the volume harvested in the TSA.

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia,

Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). The letter and memorandum include objectives for forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability." He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

I have considered the contents of the letter and memorandum in my determination of an AAC for the 100 Mile House TSA. I am satisfied that this determination is consistent with the economical and social objectives as expressed by the minister.

Local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives. Many public responses to the information report and data package, and to the timber supply and socio-economic analyses were received. The summary of public input is reproduced in full as Appendix 5.

The CCLUP, the intent of which forms current practice in the 100 Mile House TSA and which has been accounted for in this determination, was approved after years of public dialogue and negotiation. I take this as an important statement of local objectives in the 100 Mile House TSA.

I have reviewed the submission from the David Suzuki Foundation, in particular their concern about managing all values equally, and not maximizing timber volumes at the expense of other resources such as wildlife, fish and biodiversity. I note that in the 100 Mile House TSA, over 173 000 hectares of the total TSA (over 14 percent) have been set aside from harvest as new parks, environmentally sensitive areas, riparian areas, caribou habitat and wildlife tree patches. This area is in addition to established parks and protected areas. It is true that the timber supply process does analyze timber supply; however the purpose of the timber supply review is to determine the appropriate allowable annual cut for the timber supply area. Other processes, such as the Forest Practices Code and land-use planning, have been developed to provide for the protection other important values, such as biodiversity, and fish and wildlife. The timber supply review process is designed to incorporate the results of these processes.

I have considered all public input received on the timber supply review. Local objectives and public input are both very important components of this determination and where possible I have attempted to respond briefly to this input in this rationale.

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Unsalvaged losses

Unsalvaged losses are timber volumes destroyed or damaged by agents such as fire and disease that are not recovered through salvage operations. A number of parasites, fungi or plants can kill trees or degrade the quality and value of logs. In the analysis, an annual volume reduction was applied to account for unsalvaged losses. This reduction accounts for epidemic (abnormal) infestations on the timber harvesting land base that are not incorporated into yield estimates used in the analysis. Timber volume losses due to insects and diseases that normally affect existing stands (endemic losses) are generally accounted for in inventory sampling for existing timber yield estimation or though other methods.

Losses associated with second-growth stands are addressed as noted under *operational adjustment factors*.

District staff reviewed data on losses resulting from wildfire, mountain pine beetle, Douglas-fir beetle, western spruce budworm, pine needle cast, armillaria root disease and wind damage to derive an appropriate reduction for the timber supply analysis. From this, a total of 34 370 cubic metres was assumed to be lost annually, and this volume was excluded from the harvest levels for the entire planning horizon.

Since then, regional staff have reviewed information regarding current infestation levels, which indicate that the Douglas-fir bark beetle, spruce bud worm and pine needle cast are potentially occurring at higher than normal levels, and that the mountain pine beetle population could escalate into epidemic proportions within a few years.

I have reviewed the analysis assumptions about unsalvaged losses in the 100 Mile House TSA. I note that there is concern about the potential for increased unsalvaged losses, which could result in some risk to the long-term timber supply. I will consider this risk to timber supply as discussed below, under 'Reasons for decision'. I encourage district staff to continue to monitor trends such that additional information regarding infestations can be incorporated into future timber supply analyses.

Reasons for decision

In reaching my AAC determination for the 100 Mile House TSA, I have considered all of the factors presented to me, and I have reasoned as follows.

In the 2001 timber supply analysis, the base case harvest level of 1 335 600 cubic metres per year could be maintained for ten decades. After the 10th decade, the harvest level declines by about 4 percent to a steady long-term harvest level of 1 281 600 cubic metres per year. The existing partition of 112 000 cubic metres per year for Pulpwood Agreement 16 can be maintained for 20 years.

Section 8 of the *Forest Act* requires me to consider a number of factors in the determination of an AAC for a timber supply area. In determining an AAC, my considerations identify factors which, when considered separately, indicate that the timber supply may actually be greater or less than that projected in the base case. Some factors can be quantified and their impacts assessed with some reliability. Others may influence timber supply by introducing an element of risk or uncertainty to the decision, but cannot be reliably quantified at the time of the determination.

I am satisfied that the assumptions applied in the base case forecast of the analysis for the majority of the factors applicable to the 100 Mile House TSA were appropriate. Following is my consideration of those factors for which I consider it necessary in this determination to take into account implications to the timber supply projected in the base case.

Factors that indicate that the timber supply projected in the base case forecast may be underestimated, are as follows:

1 *site productivity* – the results from provincial studies of site productivity when applied to the 100 Mile House TSA, indicate that the long-term timber supply could be up to 4.2 percent higher.

2 *stand-level biodiversity* – the timber supply has been underestimated by at least 3 percent (using Table 20a) and up to a further 5 percent (using Table 20a and recovery of up to half of the wildlife trees). This underestimation results in an upward pressure of 3 percent in the short term, and between 3 to 8 percent in the mid to long term if some of the wildlife trees are harvested over time.

In addition to those factors that indicate that timber supply may be underestimated in the base case, I have also identified a number of factors that indicate that the base case harvest projection likely overestimates timber supply. Some of these factors can be quantified, as follows:

1. *woodlots* – in the base case forecast, 26 400 cubic metres per year were deducted to account for woodlots. However, an additional 1000 hectares have been added to woodlots with an associated AAC of 1600 cubic metres per year. I have accounted for all issued woodlots in this determination.
2. *lake classification* – additional buffers on class A, B, & C lakes have reduced the timber harvesting land base by 7442 hectares, which represents a downward pressure of about 1 percent in the short to long term.
3. *landscape-level biodiversity* – in the base case, it was assumed that forests outside the timber harvesting land base would age continuously, and hence old-growth forest (old-seral) requirements can be achieved entirely from the non-contributing forest. However, non-contributing forests do not age continuously and therefore some old-seral requirements will be located on the timber harvesting land base. This represents a downward influence on the base case forecast of up to 5 percent over the long term.

Factors that indicate that timber supply projected in the base case forecast may overestimate actual timber supply, but to a degree that cannot be precisely quantified, are as follows:

1. *existing stand volumes* – I accept that there is a risk that existing stand volumes could be overestimated for the 100 Mile House TSA. Although the exact magnitude of this overestimation is uncertain, it could be up to 11 percent acting on the short- to mid-term timber supply.
2. *backlog NSR* – I accept that some of the 7439 hectares of backlog NSR will likely not be either fully restocked or converted to a productive forest, and therefore this represents a small-unquantified risk to the long-term timber supply.
3. *ungulates* – recent direction from the mule deer strategy has expanded the criteria for selection harvesting to include stands with more than 20 percent Douglas-fir — not just more than 40 percent. This could affect up to 4.3 percent of the timber harvesting land base. Increasing the amount of area that is to be selectively harvested by this magnitude would not impact the timber supply in the short term, but likely represents a small unquantified downward pressure in the mid to long term.

4. *unsalvaged losses* – a review of new information by regional staff shows that losses associated with infestations are potentially above historic averages. This new information could represent some unquantified risk to the long-term timber supply.

I have considered the factors listed above and have evaluated them on the basis of which portion of the forecast period they affect (the short, mid or long term). I have weighed the order of magnitude and although some are more quantified than others, some are uncertain and I make the following observations as they affect the timber supply and their overall implications for the AAC.

There are two quantified factors that act to increase the short-and long-term timber supply. I consider that the amount of area and volume deducted for stand-level biodiversity (wildlife trees and patches) has likely been overestimated by at least 3-percent in the short-term, and up to 8 percent in the long term. In addition, site productivity may be underestimated and hence on this account the long-term timber supply could be up to 4.2 percent higher than indicated by the base case. The magnitude of the factors acting to increase the timber supply is in the range of 3.0 percent in the short term, and between 7.2 and 12.2 percent in the long term. In addition to these two quantified factors, I have considered the limited use of select seed in the 100 Mile House TSA to represent an unquantified upward pressure on timber supply over the long term.

On the other hand, there are factors that act to decrease the short- and long-term timber supply. I consider that the timber harvesting land base has been overestimated by about 1 percent for lake buffers. Also, due to the continuous ageing applied to the non-contributing forests, the base case forecast likely overestimated timber supply by up to 5 percent over the long term. The magnitude of these two quantified downward factors influencing the timber supply is in the range of 1 percent in the short term and up to 6 percent in the long term.

The unquantified factor that could potentially act to decrease the short-term timber supply is the estimate of existing stand volumes. The recent inventory audit shows that volumes may be overestimated by between 0 to 11 percent; however I am mindful that the recent audit did not indicate that the difference (between the ground samples and the forest inventory) was statistically significant. A sensitivity analysis shows that if existing stand volumes are overestimated by 10 percent, then the timber supply forecasts could still be maintained for two decades, with no impact on the long-term timber supply. The short term upward pressure of 3 percent weighed against the uncertain downward pressure due to existing stand volumes adds even further weight to the maintenance of the projected short-term harvest level—in consideration of the sensitivity analysis.

In the long term, in review of the quantified factors, I note the upward pressures likely offset the downward influences, if some but not all of the proposed wildlife trees are harvested. Nonetheless, I am mindful of the other unquantified downward pressures on timber supply including backlog NSR, ungulates and unsalvaged losses.

In reaching this assessment, as discussed above, under alternative rates of harvest, a notable feature of the base case forecast is its relative stability over time. It shows that the current AAC of 1 362 000 cubic metres less woodlots could be maintained for 10 decades before a one-time decline of 4 percent is required to reach the steady long-term harvest level. An

alternative forecast examined a 10 percent increase in the short-term, which could be maintained for 4 decades, without compromising the long-term timber supply.

Notwithstanding the stability of the timber supply forecasts, it is imperative to improve the confidence regarding existing stand volumes. The Vegetation Resource Inventory (VRI) approach will better describe the existing forest inventory, and hence volume estimates. This in turn will improve confidence regarding seral stage distribution and other aspects of biodiversity. For this determination staff are unable to project the outcome of a VRI approach, however for the next determination I stress the importance of improving the forest inventory for the 100 Mile House TSA.

I am also aware of the Lignum Innovative Forest Practices Agreement, which covers part of the TSA, and results from the agreement could show that higher timber supply forecasts are possible due to incremental silviculture and other associated investments on the land base. While this has not been incorporated into the timber supply analysis, I am mindful that this could potentially influence the next determination.

I have reviewed the information regarding PA 16—issued to Ainsworth Lumber Co.—which currently provides the rights to harvest up to 112 000 cubic metres of problem forest types within the 100 Mile House TSA. I understand that a BCFS and licensee working group has been reviewing the licence agreement to clarify management issues regarding the terms of the licence agreement. As well, I am aware that Ainsworth has requested that the harvest level for 100 Mile House TSA be increased to 135 000 cubic metres per year for the remainder of the agreement. However, until the licence agreement has been formally amended, I am unable to reflect decisions not yet contained in the agreement.

In this determination for the 100 Mile House TSA, although the timber supply is reasonably stable, I am concerned that it is possible that future analyses may show a more declining forecast compared to the current forecast. I make this statement not to say the harvest level is declining, but in order to emphasize the importance and urgency of addressing the noted uncertainties affecting the timber supply.

In summary, I am satisfied that an appropriate harvest level for the 100 Mile House TSA at this time is 1 334 000 cubic metres. This harvest level includes a partition of 112 000 cubic metres per year for Pulpwood Agreement 16.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties associated with the information provided. It is my determination that a harvest level that accommodates objectives for all forest resources during the next five years, that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in the 100 Mile House TSA by establishing an AAC of 1 334 000 cubic metres. This AAC includes a partition of 112 000 cubic metres for the Pulpwood Agreement 16, and after accounting for 28 000 cubic metres per year for issued woodlot licences, remains unchanged.

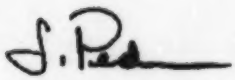
If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the five years required by legislation.

Implementation

In the period following this decision and leading to the subsequent determination, I encourage staff from the BCFS, MWLAP and MSRM to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this rationale document. I recognize that the ability of staff to undertake these projects depends on available staff resource time and funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the 100 Mile House TSA. I recommend that staff undertake the following:

- Review operability and determine any necessary adjustments before the next determination.
- Review the assumptions regarding accounting for roads, trails and landings requirements.
- Review the requirements of the PA16 agreement to ensure that any necessary adjustments are applied in the next determination.
- Complete a Vegetation Resource Inventory for the TSA; in particular to improve the forest cover attributes.
- Continue to review OAF adjustments using local data.
- Collect and analyse more local data regarding site productivity estimates for the TSA.
- Review actual utilization standards to determine if accurate levels can be directly reflected in the next timber supply analysis.
- Confirm the information regarding riparian and buffers around lakes and clarify the applicable management regimes.
- Review the amount of salvage harvesting permitted in the no-harvest caribou zone to ensure that appropriate measures are incorporated into the next timber supply analysis.

- Review the data for the mule deer strategies during the course of developing sub-regional planning guidelines.
- Review the objectives for stand-level biodiversity and track the amount of area and volume required for wildlife trees or patch retention in the field to resolve any overlap with other constraints applied in the next timber supply analysis.
- Fully review the concern that the forest inventory may overestimate forest ages (as indicated by the 1999 inventory audit) and hence affect assumptions regarding the achievement of the seral stage distribution for landscape-level biodiversity.



Larry Pedersen
Chief Forester
December 18, 2001

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, reads as follows:

Allowable annual cut

8. (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

(iii) silvicultural treatments to be applied to the area,

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

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Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

(a) encourage maximum productivity of the forest and range resources in British Columbia;

(b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

(c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;

(d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and

(e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996

Appendix 5: Summary of Public Input

File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of British Columbia
Minister of Forests
Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,

Andrew Petter
Minister

Province of British Columbia
OFFICE OF THE MINISTER

Ministry of Forests

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: **The Crown's Economic And Social Objectives Regarding Visual Resources**

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

.../2

In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis*.

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

Andrew Petter
Minister of Forests

100 Mile House Timber Supply Area
Timber Supply Review

Summary of Public Input

BC Ministry of Forests
100 Mile House Forest District
300 S. Cariboo Highway
PO Box 129
100 Mile House, BC
V0K 2E0

December, 2001

This is a summary of the public input received on the Timber Supply Review in the 100 Mile House Timber Supply Area. This summary does not assess the feasibility or validity of the input or whether it relates to the clearly defined mandate of the chief forester in the allowable annual cut determination.

100 Mile House Timber Supply Area

Background

As part of the review of timber supply in the 100 Mile House Timber Supply Area (TSA), two opportunities were provided for public input. The first followed the release of the 100 Mile House Timber Supply Area *Data Package* and *Information Report* in May 1998. The *Information Report* was a non-technical summary of the draft data and management assumptions that were to be applied in reviewing the timber supply for the 100 Mile House TSA. A 30-day review period, ending June 1, 1998, was provided for the public to comment on these documents.

On July 5, 2001, the British Columbia Forest Service released the *2001 100 Mile House Timber Supply Area Analysis Report* and *Public Discussion Paper*. The public was encouraged to review and comment on the accuracy of the information in these documents and to provide additional information during the 45-day review period that ended August 20, 2001.

This report summarizes the input received during both public review periods. This information was provided to the chief forester for his consideration when he reviewed the AAC for the 100 Mile House TSA. The first section of this summary outlines the public review process implemented by the Forest Service, and describes the types of public input received. The second section summarizes the public input in sufficient detail to indicate the range of input received. The original submissions (with personal identifiers removed in accordance with the *Freedom of Information and Protection of Privacy Act*) can be reviewed at the 100 Mile House Forest District office.

Public Review Process and Response

100 Mile House District staff and Cariboo Regional staff actively solicited public input on the Timber Supply Review in the 100 Mile House TSA through the following actions:

- copies of the *Data Package, Information Report, Analysis Report* and *Public Discussion Paper* were mailed to stakeholders in the TSA, including First Nations, licensees, local governments and environmental groups. Meetings or presentations were offered.
- the *Data Package* and *Analysis Report* were available at both the district office in 100 Mile House and the Cariboo regional office in Williams Lake.
- newspaper advertisements were placed, advising of the availability of all documents for review by the public.

The 100 Mile House Forest District received one written submission on the *Data Package* and three submissions on the *Analysis Report* (see Appendix 1).

Public Input

In this section, public input on the information presented in the Timber Supply Review documents for the 100 Mile House TSA is summarized under the following headings:

- Data Package (and Information Report)
- Timber Supply Area Analysis Report
- Other comments

100 Mile House Timber Supply Area

Data Package

Land Base Factors

The submission from the 100 Mile House TSR Licensees Working Group (the licensees) expresses opposition to excluding from the harvesting land base all areas with slopes exceeding 50 percent and recommends no reductions be made due to inoperability. The licensees express the opinion that potentially all of the TSA is operable and any minor exceptions will be excluded through visual or other constraints. The licensees also note that over the last 10 years, 200 to 300 hectares have been harvested using cable or helicopter systems on slopes over 50 percent.

The licensees also express concern about the reduction from the productive land base to account for roads, trails and landings (RTLs). They say a large proportion of the reduction is associated with temporary roads and landings that support significant healthy regeneration and that are not part of a licensee's free-to-grow commitment. The licensees also object to the removal of the full road width, saying trees along roads use growing space occupied by a portion of the road surface. The licensees provide data from an audit of regeneration ingress on historic RTLs, and recommend a deduction as per that report (2.5 to 3 percent).

The licensees say the assumption of no harvesting for 20 years in caribou areas is contrary to the Cariboo-Chilcotin Land-Use Plan Integration Report (CCLUP-IR). The report allows modified harvesting in 25 percent of the area over the first 20 years, as well as harvesting in 10 percent of the area for salvage purposes or using alternative harvesting systems. The licensees say these directions must be used in the timber supply analysis.

Volume Estimates for Regenerated Stands

The licensees express concern that the findings of the J.S. Thrower and Associates report on growth rates in regenerated stands will only be applied to the stands surveyed. The licensees recommend the results be applied to all age class 1 or 2 stands throughout the analysis period.

The licensees also express concern that no managed stand yield tables exist for selection management. They say that, based on observation, it's clear the use of natural stand yield tables significantly underestimates the productive capacity of these sites and they request a sensitivity analysis that demonstrates a more realistic level of productivity.

Regeneration and Silvicultural Factors

The licensees ask that the regeneration delay for deciduous-leading naturally-regenerated stands be reduced from seven to four years. They also suggest the level of planting on poor site pine stands be increased from 10 percent to 40 percent.

The licensees express disagreement with the *Data Package* assumption that all areas disturbed prior to 1967 are not eligible for density control and will be considered unmanaged stands. They note that 1349 hectares have been spaced in stands clearcut prior to 1967 and that many of the older fir stands harvested by selection methods have been spaced. The licensees also ask that post-spacing densities be reviewed, saying licensees' current practice is 3250 to 4250 stems per hectare.

Utilization Factors

The licensees say that with improvements in harvesting and manufacturing, licensees can utilize a smaller timber profile. They say stands should be available for harvest at a minimum diameter or at culmination age, whichever is earliest, rather than at a predetermined age. They recommend that, at a minimum, this approach be tested in one of the CCLUP management zones.

Unsalvaged Losses

The licensees express the opinion that a portion of the estimate of unsalvaged losses is accounted for in inventory sampling, as it results from natural processes in the forest. They also question the losses to blowdown applied to every block harvested, saying that one-third of the blocks are in the dry belt and selective logging

areas where there is no history of blowdown losses along cutblock boundaries.

Green-up Requirements

The licensees say the chief forester's direction on evaluation of stands for green-up will functionally reduce the height to achieve green-up. They say using yield curves to project green-up age is a crude tool, but some recognition of the reduced requirement should be made either in a sensitivity analysis or in the actual ages used in the analysis.

Mule Deer Winter Range

The licensees say the *Data Package* is essentially correct with regard to removal percentages and re-entry periods in mule deer winter range (MDWR) areas. However, they say it's unreasonable to assume that the only Douglas-fir-leading area available for harvesting in the first 50 years of the analysis period is the area currently identified as available. They note that the CCLUP-IR indicates that MDWR volumes will be accessed in the 20-year time period through various means.

Wildlife Tree Patches

The licensees make three comments with regard to wildlife tree patches (WTPs):

- in selection harvesting, large Douglas-fir stems are double-counted, as they are deducted for both wildlife tree and silvicultural basal area purposes. The area associated with these large stems should be added to the productive land base to eliminate this duplication.
- the CCLUP-IR directs that 50 percent of WTPs will be removed over a rotation and this should be incorporated in the analysis.
- the cumulative percentage for riparian and WTP reductions is about 18 percent, which violates the objective of the Forest Practices Code to not exceed six percent. The *Data Package* should include a statement supporting the Code's objective and a commitment to move to the six percent goal.

Landscape Level Biodiversity

The licensees do not agree that seral stage management as described in the *Data Package* can be considered as current management, noting that landscape level plans are only being developed. They say the approach to landscape biodiversity in the CCLUP-IR should be recognized.

Cariboo-Chilcotin Land-Use Plan

The licensees express the opinion that the land use plan has not been adequately addressed in the *Data Package*, noting the plan's implementation will have immediate and pronounced impacts on many of the elements addressed in the analysis, including biodiversity, mule deer and caribou. They maintain the CCLUP-IR must be treated as current management, given its adoption in April 1998 and its inclusion in direction letters to forest development plan proponents. The licensees say that because the IR indicates timber access targets have to be met, reductions to the land base should be considered in conjunction with these.

The licensees note that the IR analysis includes a test that compares long-term timber supply analysis results against the Short Term Timber Availability Assessment completed in 1996. They say the results indicate there is more than sufficient volume to meet the 20-year requirements, and this is critical information that should be highlighted in the *Data Package*.

Timber Supply Area Analysis Report

Land Base Factors

The submission from the association representing the major licensees questions the land base reductions for roads, trails and landings (RTLs). The association says a reconnaissance level survey done in 1999 showed a 0.5 to 1.0 percent increase in the harvest level as a result of RTL netdowns being reduced from Timber Supply Review assumptions. A survey acceptable to the Ministry of Forests will be carried out in 2002, according to this submission.

Volume Estimates for Existing Stands

The licensees' association says that although uncertainty exists about volume estimates for mature stands, the actual uncertainty remains unquantified. The association expresses concern that information in the *Analysis Report* (e.g., Figure 23) sends a message to the public and the chief forester that current harvest levels are not sustainable beyond one or two decades. The association believes this is unlikely since other analyses indicate many opportunities to enhance the current harvest. Two examples are provided:

- preliminary analysis from Vegetation Resource Inventory work in the Lignum Innovative Forest Practices Agreement area indicates that current volume estimates in the Interior Douglas-fir (IDF) Zone may be low.
- ongoing work on calibrating yield models in the IDF Zone is indicating a higher average annual growth than that used in the Timber Supply Review.

Volume Estimates for Regenerated Stands

The licensees' association refers to a 1998 report by J.S. Thrower & Associates that showed increased annual growth in regenerated stands. Although the report was provided to the Ministry of Forests, the association says it was not included in the base case analysis. An FRBC-funded initiative will be completed in 2001 and will identify approaches to incorporate the results of the Thrower report for timber supply planning, according to this submission.

Wildlife Tree Patches

The licensees' association says the netdown percentages for wildlife tree patches are exceedingly high compared to surrounding TSAs. Comparisons are provided.

Socio-Economic Factors

The David Suzuki Foundation says if the primary goal of harvesting is to provide employment and income, other ways to accomplish this besides increasing the AAC and losing other values of the forests must be considered. The foundation says clearcut industrial logging is not sustainable and a new approach may mean a lower AAC, but with a greater good and value distributed throughout the community.

Other Comments

Two submissions comment on factors or issues other than those specifically covered by Timber Supply Review documents. These comments are summarized in this section.

Management Practices and Approach

The David Suzuki Foundation says the resources of the Ministry of Forests' must be applied to managing our forests for all values equally, not maximizing timber volumes as the primary goal while squeezing in token gestures for other values such as wildlife, fish and biodiversity. The ministry should act as an intermediary between all interested parties, not as an advocate for timber interests, according to the foundation.

Harvest Levels

The David Suzuki Foundation says increasing the AAC will severely limit planning of both where and how to harvest. The foundation says the present AAC is too high and must be lowered to consider all values of the precious few remaining old-growth forests.

The licensees' association says the analysis is on balance a reasonable reflection of current forest management practices, but expresses concern that the analysis overemphasizes a possible downward pressure on the AAC attributable to the inventory audit. Specifically, the association says:

- other technical information is coming forward that contradicts some of the audit results.
- the analysis uses information that in some cases is conservative and with further quantification will exert an upward pressure on harvest levels.
- analyses by the licensees and the Timber Investment Strategy Committee have identified a number of opportunities to increase harvest levels.

The association says the potential for cumulative upward pressures and opportunities should be reflected in the analysis and conveyed to the public and the chief forester. The submission provides examples of a higher AAC resulting from different assumptions for operability, wildlife tree patches, green-up ages, minimum harvest ages, RTLs, regeneration delay, use of genetically improved stock, fertilization and problem forest type rehabilitation.

Apportionment of PA 16

Ainsworth Lumber Company says they are participating in a working group with the regional managers of the Cariboo and Kamloops forest regions to clarify management issues for Pulpwood Agreement #16 (PA 16). The company says the issue of harvest apportionment for PA 16 should be considered in the Timber Supply Review for four TSAs, including 100 Mile House.

With regard to regional apportionment, Ainsworth recommends a 45/55 split between the Kamloops Region and the Cariboo Region, respectively, based mainly on timber availability shortfalls in the Lillooet TSA.

With regard to apportionment among TSAs, Ainsworth notes that the region and districts in the Cariboo region have not provided "exclusivity" to Ainsworth within PA 16 and allow other licensees to harvest the forest types that Ainsworth is restricted to. The company recommends an allocation of 135,000 cubic metres for the 100 Mile House TSA, which agrees with the ministry's recommendation and represents an increase from the current apportionment of 112,000 cubic metres.

Appendix 1

Submissions received by the 100 Mile House Forest District

Submissions received on the Data Package

Forest industry
100 Mile House TSR Licensees Working Group

Submissions received on the Timber Supply Analysis Report

Forest industry
100 Mile House TSA Major Licensee's Association
Ainsworth Lumber Co.

Interest groups
David Suzuki Foundation